THAT WHICH IS CLAIMED IS:

1. A method for creating an optical filter having aperiodically configured filter elements, comprising:

selecting initial characteristic attributes for the filter elements based upon a random seed;

generating an initial configuration of the filter elements having the initial characteristic attributes;

defining a cost function representing a goodness of fit between a desired spectral response and a computed spectral response of the optical filter;

using a simulated annealing process to iteratively compute the cost function by modifying at least one characteristic attribute of at least one filter element; and

if the iteratively computed cost function is less than a predetermined cost function, selecting the configuration of the filter elements that corresponds to the iteratively computed cost function as a desired configuration of the filter elements to provide the desired spectral response.

2. The method of claim 1, wherein at least one of the characteristic attributes comprises a physical dimension of a respective filter element.

3. The method of claim 2, wherein the physical dimension comprises at least one of a width and a height of the respective filter element.

4. The method of claim 1, wherein at least one of the characteristic attributes comprises a refractive index of a respective filter element.

5. The method of claim 1, wherein at least one of the characteristic attributes comprises a spacing between adjacent filter elements.

6. The method of claim 1, wherein using a simulated annealing process comprises performing at least one Fourier transform of the characteristic attributes of the filter elements.

7. The method of claim 1, wherein the optical filter has a fixed length.

8. The method of claim 1, wherein a total number of the filter elements is fixed.

9. The method of claim 1, further comprising implementing the optical filter as a grating on an optical waveguide.

10. The method of claim 1, wherein the desired spectral response comprises transmission peaks located at wavelengths corresponding to an ITU grid.

11. The method of claim 1, wherein the desired spectral response is selected to compensate for a gain of a laser or amplifier.

12. A method for producing an optical waveguide with at least one desired optical transmission characteristic, comprising:

selecting initial characteristic attributes for aperiodically configured grating elements based upon a random seed;

generating an initial configuration of the grating elements having the initial characteristic attributes;

defining a cost function representing a goodness of fit between a desired spectral response and a computed spectral response of the optical waveguide;

using a simulated annealing process to iteratively compute the cost function by modifying at least one characteristic attribute of at least one grating element;

if the iteratively computed cost function is less than a predetermined cost function, selecting the configuration of the grating elements that corresponds to the iteratively computed cost function as a desired configuration of the grating elements to provide the desired spectral response; and

forming an aperiodic grating corresponding to the desired configuration of the grating elements in or on the optical waveguide so that the optical waveguide has the at least one desired optical transmission characteristic.

13. The method of claim 12, wherein the optical waveguide comprises a semiconductor waveguide and wherein forming the aperiodic grating comprises forming the grating elements by a semiconductor process selected from the group consisting of electron beam lithography, photolithography,

focused ion beam milling, chemical etching, and gas-assisted etching.

14. The method of claim 12, wherein at least one of the characteristic attributes comprises a physical dimension of a respective grating element.

15. The method of claim 14, wherein the physical dimension comprises at least one of a width and a height of the respective grating element.

16. The method of claim 12, wherein at least one of the characteristic attributes comprises a refractive index of a respective grating element.

17. The method of claim 12, wherein at least one of the characteristic attributes comprises a spacing between adjacent grating elements.

18. The method of claim 12, wherein using a simulated annealing process comprises performing at least one Fourier transform of the characteristic attributes of the grating elements.

19. The method of claim 12, wherein the optical filter has a fixed length.

20. The method of claim 12, wherein a total number of the grating elements is fixed.

21. The method of claim 12, wherein the desired spectral response comprises transmission peaks located at wavelengths corresponding to an ITU grid.

22. The method of claim 12, wherein the desired spectral response is selected to compensate for a gain of a laser or amplifier.